BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Biomedical Science Pearson BTEC International Level 3 Diploma in Environmental Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Biomedical Science Pearson BTEC International Level 3 Extended Diploma in Environmental Science
Unit number and title	**Unit 25: Water Quality**
Learning aim(s)	**A:** Understand the properties and uses of water
Assignment title	**Properties and uses of water**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are a laboratory technician working in an analytical laboratory for a local water supply company and in this role, you have learnt that water is a precious and valuable world resource, it needs to be conserved and controlled both effectively and efficiently. It is used in large volumes by industry and for domestic everyday use. In order to conserve, treat and reduce the impact of human activity you and other scientists and technicians working in the water/marine sector need a good understanding of the biological, chemical and physical properties of water, the hydrological cycle and the water footprint. There is a young person from a local academy visiting your department for a week and you have been asked by your supervisor to produce a portfolio that this visitor may have to help them understand the work of the department and the wider implications of managing water across the world.

Task	To build your portfolio you must **explain** the properties of water in terms of bonding and structure, **explain** the hydrological cycle and **describe** the importance and use of water for a range of life processes and commercial applications. You will also include an **assessment** of the impact of different climates and human activity on the hydrological cycle and an **evaluation of** the concept of water footprint for a range of products, individuals and countries**.** Your portfolio will be in the following 3 sections: Section 1 – The properties and importance of water • **Explain** the properties of water in terms of bonding and structure using diagrams. Show how the polarity of the bonds gives rise to hydrogen

	bonding and the unusual physical properties of water and make a comparison with molecules of a similar size and mass (for example methane). Also consider the chemistry of water and its acid-base nature using examples of metals, inorganic and organic substances with which it reacts. • **Explain** the hydrological cycle using an annotated diagram, which must be designed and produced by you (a sourced diagram is not acceptable evidence). Include the scientific principles behind the processes of transportation of water and how it is stored in the atmosphere, in earth and in the oceans. • **Describe** the importance and use of water for the following life processes and commercial applications: o as a solvent o transport for nutrients and waste o medium for chemical reactions o reactant in photosynthesis o pH regulation o electrolyte balance o temperature regulator o cohesion tension in transpiration o production of hydrogen (fuel) Section 2 – **Assess** the impact of climates and human activity on the hydrological cycle • Carry out a review of at least two different climates (e.g. tropical, dry, moderate, continental or polar) and associated conditions such as sunlight, temperature, rainfall, airflow, seasonal changes and vegetation. Explain how the equilibrium of processes in the hydrological cycle is different in each case. Assess the impact of human activities (e.g. agriculture, burning fossil fuels, deforestation, removal of groundwater and river water, construction of dams, urbanisation) on processes in the cycle, include the effect of climate change. Section 3 – The concept of the water footprint **Evaluate** the concept of water footprint. Research the concept and objective of water footprint and discuss its advantages and limitations by comparing its usefulness against similar measures such as carbon footprint. Compare the water footprint for a range of products (for example crop and animal products) in terms of the amount of water used and the percentage of each component including green, blue and grey footprints. Draw conclusions on the effective use of water. Compare the water footprint of individuals and countries, explaining differences and in the context of hydrology, climate, geology, topography, population and demographics.
Checklist of evidence required	A research portfolio that includes:

	• An description of the importance and use of water • An explanation of the hydrological cycle • An explanation of the physical and chemical properties of water • An assessment of the impact of different climates and human activity on the hydrological cycle • An evaluation of the concept of water footprint.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
A.D1	Evaluate the concept and use of the water footprint for a range of products, individuals and countries.
A.M2	Assess the impact of different climates and human activity on the hydrological cycle.
A.M1	Explain the physical and chemical properties of water.
A.P2	Explain the steps in the hydrological cycle.
A.P1	Describe the importance and uses of water.
Sources of information to support you with this Assignment	All sources of information suggested are UK based. Centres are free to amend these sources to those available in the Country of delivery where more appropriate. www.edu.rsc.org.uk – The water cycle; Precious water; The structure if ice and water www.STEM.org.uk - Water, The water cycle www.waterfootprint.org – water footprint network www.pmm.nasa.gov – Hydrologic cycle www.nationalgeographic.org – Hydrologic cycle Within the copyright laws learners could search YouTube for:–- What is your water footprint?; The global water footprint of humanity; Hydrologic Cycle; The Water (hydrologic) cycle; Properties of water / hydrogen bonding / biology / biochemistry
Notes to the Assessor and technician	Practical work may be undertaken when teaching learners the unit content in preparation for this assignment, but is not required to complete the assignment itself. Before doing any practical activity, you should always carry out your own risk

	assessment and refer to the necessary regulations. In particular, any local rules issued by your employer must be obeyed, regardless of what is suggested here. Centre should use Health and Safety information provided by a reputable source. In the UK such an example organization is CLEAPSS http://science.cleapss.org.uk/